

Official Amendment

Serial No. - 10/038,274

Docket No. - UVD 0280 PA / 40815.324

REMARKS

Claims 1, 3-48, 123, 124, 126-128, 130-133, 135-148, and 151-154 were pending in the present application. Claims 1, 10, 11, 14, 123, 148, and 151 have been amended, claims 9, and 133 were canceled. As a result of this amendment, claims 1, 3-8, 10-48, 123-124, 126-128, 130-132, 135-148, and 151-154 are pending. Reexamination and reconsideration are requested in light of the accompanying amendments and remarks.

The rejection of claims 1, 3-12, 14-15, 123, 124, 126, 130-133, 135-148, and 151 under 35 U.S.C. § 103(a) as being unpatentable over Applicant's Admitted Known Prior Art in Specification has been overcome. According to the examiner, "Applicant's Admission includes teachings of cobalt complexes having the claimed valences and valence stabilizers (e.g. inorganic or organic stabilizers) (page 5, line 23 to page 7, line 6)."

However, contrary to the examiner's position, these references do not render the claimed invention obvious. Claims 1 and 148 recite that the valence stabilizer is selected from organic valence stabilizers and inorganic valence stabilizers, with the proviso that the inorganic valence stabilizer is not a vanadate or a tungstate. The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the coating in order to provide adequate corrosion protection.

The general concept of valence stabilization of cobalt in solution was known. However, a trivalent or tetravalent cobalt/valence stabilizer complex incorporated in a solid film for corrosion inhibition is novel.

With respect to the discussion at page 5, line 23 to page 6, line 16, those references are all directed to "stabilizing" the trivalent oxidation state of cobalt while it is in aqueous solution, e.g., to increase the bath life, etc. None of these references teach or suggest the functionality of trivalent or tetravalent cobalt within a solid, corrosion-inhibiting conversion coating formed on a substrate metal. In fact, stabilizing trivalent cobalt in solution does not necessarily produce an effective solid, corrosion-inhibiting cobalt conversion coating. In the majority of cases, adding

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stabilizers to the bath is actually detrimental to the coating formed due to solubility differences, as discussed above.

As noted on page 5 of the present application, the cited prior art uses additives called "bath stabilizers". These chemical species form more stable coordination bonds with trivalent cobalt cations than with divalent cobalt cations in an aqueous conversion coating solution. Specifically, carboxylates, hydroxyalkyl amines (aminoalcohols, such as triethanolamine), or nitrito complexes are described as being added to the bath to retain trivalent cobalt in solution and to stabilize concentrations during the coating process. However, unlike the present invention that is directed to maintaining oxidized cobalt (i.e., trivalent and/or tetravalent cobalt) in a solid, corrosion-inhibiting conversion coating formed on a substrate metal, the prior art bath stabilizers only treat and extend the service life of the trivalent cobalt in the conversion coating solution.

Moreover, in contrast to the present application, "bath stabilizers" used in the manner of these specifications reduce the formation and precipitation of trivalent cobalt-containing solids during coating deposition. Bath stabilizers described in these cited references behave similar to masking agents for chemical gravimetric analysis to keep unwanted compounds from precipitating, and actually serve to starve the deposited coating of trivalent cobalt by shifting the equilibrium away from the formation of a solid, corrosion-inhibiting conversion coating containing trivalent cobalt on the metal surface, to the trivalent cobalt remaining dissolved in the coating bath (see comparative example 2 on pages 313-314). The compounds formed from the solutions described in the cited references have lower structural stability in the coating, as well as higher aqueous solubility, than if no bath stabilizer were used at all. The solubilities of the formed compounds are too high to afford long-term corrosion protection. Stabilizing the valence of the ion in aqueous solution does not suggest its application in the solid film. The idea of using valence stabilized high oxidation state cobalt incorporated into a solid film for corrosion inhibition is novel.

With respect to the discussion at p. 6, line 17 to p. 7, line 6, the examiner stated that "[a]s indicated by the emphasized language quoted above, the rinsing step of these references causes

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formation of trivalent vanadate/tungstate complexes in the coating and that these complexes are only 'slightly soluble and serve to enhance the corrosion resistance of the deposited coating.' The amendment eliminating vanadates and tungstates as inorganic valence stabilizers renders this rejection moot.

The examiner also stated "[r]egarding the specific solubility values recited, for example in claim 1 and the limitation, "sparingly soluble" in claims 148 and 151, it is the examiner's position that, the admitted known prior art teaches that the " Co^{+3} -vanadate/tungstate complexes" form during these sealing treatments" and that these " Co^{+3} -vanadate/tungstate complexes" are encompassed by the applicants claims (for example see claims 9 and 10). Thus, in view of the fact that the " Co^{+3} -vanadate/tungstate complexes" taught by the prior art are encompassed by the instant claims, the prior art " Co^{+3} -vanadate/tungstate complexes" would be expected to possess all the same properties as the trivalent Co complexes recited in the instant claims, including the solubility recited in the instant claims. The elimination of vanadates and tungstates as inorganic valence stabilizers renders this rejection moot. The solubility limitations of the claims are not taught or suggested by the prior art.

The examiner also stated that "the properties recited in claims 2-7, 12, and 140-143, including the solubility, the electrostatic barrier, the ion exchange property, the thickness of the coating (i.e., the coating resulting from the contact with the substrate), and the cavity containing cobalt and an additional ion are inherent properties necessarily present from the presence of the same claimed chemicals, namely the trivalent cobalt complex that has been combined with a ligand (i.e. a valence stabilizer)." However, the presence of a stabilized cobalt compound in solution as in the prior art "bath stabilizers" is not the same as a cobalt/valence stabilizer complex within the solid corrosion-inhibiting conversion coating. The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the coating in order to provide adequate corrosion protection, characteristics which are not inherent in cited prior art.

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With respect to claims 12 and 13, no reference shows a cobalt/valence stabilizer complex with a central cavity containing a cobalt ion and an additional ion.

Based on the discussion at p. 6, lines 19-22, the examiner stated that "the trivalent cobalt complexes of the admitted known prior art applied in this rejection of the claims are actually in the final coating as recited in the applicants' claims. The elimination of vanadates and tungstates from inorganic valence stabilizers renders this rejection moot.

Therefore, claims 1, 3-12, 14-15, 123, 124, 126, 130-133, 135-148, and 151 would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The rejection of claims 1, 3-48, 123, 124, 126-128, 130-133, 135-148, and 151-154 under the judicially created doctrine of obviousness-type double patenting over claims 1-53 of copending Application Serial No. 10/038,150 has been overcome by the filing of a terminal disclaimer.

Applicants gratefully acknowledge the allowance of claims 152-154.

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CONCLUSION

Applicants respectfully submit that, in view of the above amendment and remarks, the application is now in condition for allowance. Applicants respectfully request that claims 1, 3-8, 10-48, 123-124, 126-128, 130-132, 135-148, and 151-154 be passed to allowance.

If the Examiner has any questions or comments regarding the present application, he is invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,
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